

Osteoporosis Resource Guide

OSTEOPOROSIS RESOURCE GUIDE

This resource guide, developed by the Texas Department of Health, is designed to provide you with important information about osteoporosis. The source of much of the information in the guide is from the National Osteoporosis Foundation. Other sources include the National Institutes of Health, Osteoporosis and Related Bone Diseases~National Resource Center and the American Academy of Orthopaedic Surgeons.

If you need additional information, the Texas Department of Health maintains a toll-free hotline and a Web site for consumers who are seeking details about osteoporosis prevention, detection and treatment.

(512) 458-7534 or (800) 242-3399

www.tdh.state.tx.us/osp/osteo



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What Is Osteoporosis?

Osteoporosis is a disease in which bones become weak and are more likely to break. If not prevented or if left untreated, osteoporosis can progress painlessly until a bone breaks. These fractured bones occur typically in the hip, spine and wrist.

Any bone can be affected, but fractures of the hip and spine are of special concern. A hip fracture almost always requires hospitalization and major surgery. It can impair a person's ability to walk unassisted and may cause long-term or permanent disability or even death.

Millions of Americans are at risk.

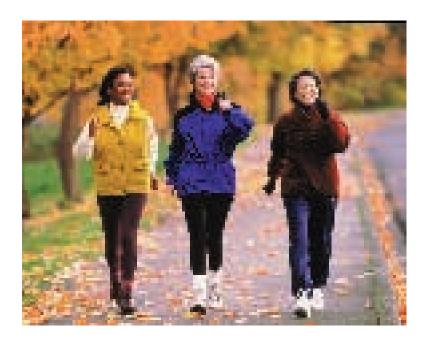
Spinal or vertebral fractures also have serious results, including loss of height, severe back pain and deformity.

Millions of Americans are at risk. While women are four times more likely to develop the disease, men also suffer from osteoporosis.

The good news is that this debilitating disease can be prevented and treated.

Bone Formation and Osteoporosis

Bone is living tissue that changes throughout life. This process of change is known as remodeling and occurs in two stages, resorption and formation. During resorption, old bone tissue is broken down and



removed. Afterward, during formation, new bone tissue is laid down to replace the old tissue that was removed. During childhood and adolescence, bone is formed at a faster pace than it is removed. This continues until peak bone mass is reached, usually by age 30-35. Of course, an individual's peak bone mass will be less than optimal unless he or she obtains enough calcium and Vitamin D throughout this early period of life.

After the age of 30, bones typically lose tissue faster than it is replaced. This is particularly true for women after menopause, when estrogen production is sharply reduced. Estrogen is a hormone produced by the ovaries that has been shown to have a protective effect on bone. Menopause usually occurs between ages 45 and 55, and after menopause, bone loss in women greatly exceeds that in men. Women can lose up to 20 percent of their bone mass in the five to seven years following menopause.

Osteoporosis develops when bone loss occurs too quickly or replacement occurs too slowly. Preventive measures can be taken to avoid excessive bone loss.

Fast Facts About Osteoporosis

- Eight million American women and 2 million American men have osteoporosis. Millions more have low bone density.
- Almost 2 million Texans have osteoporosis or low bone density.
- One in two women and one in eight men over age 50 will have an osteoporosis-related fracture in their lifetime.
- Osteoporosis is often called "the silent disease" because bone loss occurs without symptoms. People may not know they have osteoporosis until their bones become so weak that a sudden bump or fall causes a fracture.
- Americans spend \$14 billion each year on medical and longterm care for osteoporosis and related fractures.
- Texans spend \$800 million per year on health care costs associated with osteoporosis.
- While osteoporosis is often thought of as an older person's disease, it can strike at any age.

Osteoporosis = "porous bones" or thin bones.

Risk Factors at a Glance

The strongest link to osteoporosis is menopause.

Other Risks

- Certain medications or medical conditions
 - Steroid therapy
 - Estrogen deficiency
 - Excess thyroid hormone
- Age
- Gender
- Family history and personal history of fractures as an adult
- Race/Ethnicity
- Bone structure
- Body weight
- Being thin or small-boned
- Menopause/menstrual history
- A previous broken bone that might have been caused by osteoporosis
- Drinking too much alcohol
- Not getting enough exercise
- Not getting enough calcium or Vitamin D throughout life
- Smoking

Risk Factor Details

Menopause. One of the biggest changes brought on by menopause is the change it produces in women's bone strength and mass. Because your body produces less of the hormone estrogen, which is important to bone strength, your bones gradually lose mass. When this loss is severe, it can cause them to become weak and fragile.

Bone is lost quickly in the 10 years after estrogen levels fall. Women who do not take medication can lose 3 percent to 5 percent of their bone mass in each of the five years following menopause. By age 70, bones can weigh 30 percent to 50 percent less than at menopause.

Steroid Therapy. Steroid drugs, such as hydrocortisone, prednisone, methylprednisolone and dexamethasone, have powerful anti-inflammatory properties. Doctors use them to treat asthma, rheumatoid arthritis, lupus and various other illnesses. Unfortunately, long-term steroid therapy also carries the risk of osteoporosis.

A study in the November 1999 issue of the American Journal of Medicine (AJM) reports that only about one-half of the people taking steroids on a long-term basis receive treatment to prevent bone loss. But long-term steroid therapy can cause osteoporosis at any age, and it speeds up natural bone loss in the elderly. Normally, bone rejuvenates or regrows over time with an equal exchange of old cells

and minerals for new ones. Steroids upset this balance by decreasing the rate of cell replacement and increasing removal, or resorption. The AJM article reports that the amount of bone loss depends on the dose and length of therapy. Food and supplements rich in calcium and Vitamin D help, but not enough to entirely prevent bone loss. Patients on long-term steroid therapy should ask their doctors about osteoporosis.



Excessive Thyroid Hormone. People who suffer from hypothyroidism do not produce enough thyroid hormone. Doctors often prescribe thyroid hormone for these patients to make up for what the body is not making naturally. In the past, blood tests were used to determine how much thyroid hormone should be prescribed, but the tests did not determine whether the dose was too high. As a result, many people were receiving more thyroid hormone than needed. Too much thyroid hormone can significantly increase bone loss.

Today, there is a test available for anyone taking thyroid hormone. It is known as a TSH test, and it reveals whether the dosage of thyroid hormone is appropriate. If you are taking thyroid hormone, ask your doctor about having this test done. That way you can be assured you are receiving an appropriate dose of thyroid hormone and decreasing your risk of significant bone loss caused by this therapy.

Age. The older you are, the greater your risk of osteoporosis. Your bones become weaker and less dense as you age.

Gender. Your chances of developing osteoporosis are greater if you are a woman. Women are four times more likely than men to develop osteoporosis. This is because women generally have smaller, thinner bones, have less bone tissue and lose bone more rapidly than men because of the changes involved in menopause.

Family History and Personal History of Fractures as an Adult. Being at risk for a fracture may be, in part, hereditary. Young women whose mothers have a history of spine fractures also seem to have reduced bone mass. A personal history of a fracture as an adult also increases your fracture risk as you age.

Race/Ethnicity. Caucasian and Asian women are more likely to develop osteoporosis. However, African-American and Hispanic women are also at risk for developing the disease.

Bone Structure and Body Weight. Small-boned and thin women (less than 127 pounds) are at greater risk.

Menopause/Menstrual History. Normal or early menopause (brought about naturally or because of surgery) increases your risk of developing osteoporosis. In addition, women who stop menstruating before menopause because of conditions such as anorexia or bulimia, or because of excessive physical exercise, may also lose bone tissue and develop osteoporosis at higher rates.

Steps to Prevention

Give your body the calcium it needs.

The Role of Calcium. Your body needs calcium every day for life-sustaining functions, such as blood-clotting and regulating your heartbeat, as well as for maintaining a healthy skeleton. When your diet does not provide enough calcium for these functions, your body takes what it needs from your bones. Over time, this drain can weaken bones to the point where they break easily.

Calcium Supplements. If you have trouble getting enough calcium in your diet, you may need to take a calcium supplement. The amount of calcium you will need from a supplement depends on how much calcium you obtain from food sources. There are several calcium compounds from which to choose, including calcium carbonate and calcium citrate.

It is necessary for the calcium tablet to break down in order to be absorbed by the body. If you are unsure whether a tablet will break down, you can test how well it dissolves by placing it in 6 It is possible
to prevent
osteoporosis.
This is a lifelong job.
It is never too early and
never too late to start.

CALCIUM INTAKE RECOMMENDATIONS			
Age	Recommended Calcium Intake (mg/day)		
Birth – 6 months	400		
6 months – 1 year	600		
1-10	800-1200		
11-24	1200-1500		
25-50	1000		
51-64 (women on ERT* and	men)1000		
51+ (women not on ERT*)	1500		
65 or older	1500		
Pregnant or lactating womer	1200-1500		
*Estrogen replacement ther	ару		

ounces of vinegar and warm water, stirring occasionally, for 30 minutes. If the tablet has not almost completely dissolved in this time, it probably will not do so in your stomach.

Calcium supplements usually work best when taken in small doses throughout the day, with food.

Calcium Culprits. Too much protein and salt may cause your body to lose calcium. Excessive amounts of these substances should be avoided, especially in those who have low calcium intake. Beware that lactose intolerance can also lead to inadequate calcium intake.

Recommended daily amounts of calcium, from diet or vitamin supplements, are shown in the National Institutes of Health table on Page 10.

Obtain Vitamin D daily.

Vitamin D is needed for the body to absorb calcium. The recommended daily intake is 400 IU. You can safely get Vitamin D in two ways: through the skin and from your diet. Vitamin D is formed naturally in the body after exposure to sunlight; 15-20 minutes of sunshine daily is desirable. In addition, you can meet your body's Vitamin D requirements by eating foods rich in Vitamin D, such as egg yolk, saltwater fish and liver; consuming Vitamin D-fortified foods, such as cereal and milk; or taking a daily multivitamin.



Exercise regularly.

Like muscle, bone is living tissue that responds to exercise by becoming stronger. Young women and men who exercise regularly generally achieve greater peak bone mass (maximum bone density and strength) than those who do not. Women have until age 30-35 to reach peak bone mass. After that time, you may begin to lose bone. However, you can help prevent bone loss with regular exercise. Weight-bearing exercises such as walking, climbing stairs, lifting weights, jogging, aerobics and tennis are the best ways to strengthen bones.

Exercises such as swimming and bicycle riding are not considered weight-bearing, because some of your body weight is supported by the water or bicycle. However, swimming and cycling can strengthen muscles that support bones, and in combination with weight-bearing exercise, they add to a well-rounded exercise program.

If you have osteoporosis, it is important to talk with your doctor to learn which activities are safe for you. If you have low bone mass, experts recommend that you protect the spine by avoiding exercises or activities that flex, bend or twist the spine. Furthermore, you should avoid high-impact exercise, such as jumping rope, in order to lower the risk of breaking a bone. You also might want to consult with an exercise specialist to learn the best exercise program for you. An exercise specialist should have a degree in exercise physiology, physical education, physical therapy or a similar specialty. Be sure to ask if he or she is familiar with the special needs of people with osteoporosis.

Here are some ways to fit exercise into your workday:

- Schedule more walking into your day. Get off the bus a stop or two early, or park your car at the far end of the parking lot, or even a block or two away. Take a 15- or 20-minute walk during your lunch break.
- Take the stairs instead of the elevator.
- Take advantage of any exercise facilities provided by your employer. Exercise during your lunch break or before or after work.

Exercising with co-workers can add motivation and fun to your fitness routine. Invite your department to join in an exercise program in which everyone can participate.

Limit your alcohol intake.

Alcohol can slow down bone building. Drinking an alcoholic beverage on occasion does not put you at risk for osteoporosis. However, there is a connection between drinking too much and osteoporosis. Drinking alcohol is basically the same as consuming empty calories. Alcohol has no nutritional value, and it curtails the consumption of foods that supply important vitamins and minerals, including calcium. It is suspected that



Most people reach their peak levels of bone mass between ages 30 and 35.

alcohol is actually a poison to the bones, specifically osteoblasts, which are the cells that create new bone.

Don't smoke.

Tobacco Use and Bone Density. Cigarette smoking was first identified as a risk factor for osteoporosis more than 20 years ago. Studies have demonstrated a direct relationship between tobacco use and decreased bone density. Significant bone loss has been found in postmenopausal women and older men with long-term smoking exposure. In addition, a relationship between cigarette smoking and low bone density in adolescence and early adulthood has been identified.

The lifestyle of smokers also poses a risk for osteoporosis. For example, smokers are often thinner than their nonsmoking counterparts. Smokers also tend to have a higher consumption of alcohol, may be less physically active, often have nutritional deficiencies and tend to reach menopause earlier than nonsmokers. These characteristics place many smokers at an increased risk for osteoporosis apart from their tobacco consumption.

Cigarette Smoking and Estrogen. Importantly, research also has concluded that while estrogen replacement protects women from fracture, this protective effect is <u>not</u> seen in women on estrogen replacement therapy who smoke. Postmenopausal smokers have lower estrogen levels than nonsmokers. This reduction in estrogen is likely to result in an increase in bone loss, contributing to osteoporosis and fracture risk. On a positive note, researchers have discovered that smoking cessation, even later in life, may help limit smoking-related bone loss.

Fall Prevention

It is common sense for everyone to make the home and work environment safer. However, people with osteoporosis should take a special interest in fall prevention, because fractures are a serious concern for them.

Fall Prevention at Work

It is always important to maintain a safe working area, especially if you are at risk for a fracture. Here are some tips on how to prevent falls by fall-proofing your work area:

- Use mats with skid-proof backing on uncarpeted floors.
- Make sure electrical wires and computer cords are safely out of the wav.
- Keep floors in your area uncluttered.
- Mop up spills immediately.
- Make sure ladders, step stools and other equipment are sturdy and in good working order.

Much of the following information on fall prevention was obtained from The Osteoporosis Handbook: Every Woman's Guide to Prevention and Treatment, Third Edition (Bonnick, 2000).

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Bathroom Safety

- Install safety or "grab" bars in the shower or bathtub. Make sure bars are properly installed or they may be useless.
- Place a nonskid rubber mat or strips on the floor of the tub to improve traction.
- Remember that using bath oils may cause the tub to become very slippery. Apply oils and lotions after bathing. Water softeners may also make the tub slippery.
- You may also want to consider purchasing a bath chair or bath bench. These are especially helpful for people who have difficulty sitting down or standing up in the tub or who have difficulty standing for the length of the shower.

Nighttime Safety

- Leave a night light on at bedtime.
- Before going to bed, make sure all pathways are clear of objects.
- Keep a flashlight with fresh batteries beside your bed.

Kitchen Safety

- Clean up spills immediately.
- Beware of slippery floors after mopping or waxing.
- Keep frequently used items in easy-to-reach places so that stepladder use is kept to a minimum.

Safety Around the House

- Beware of the hazards of area rugs. Tripping on the corner of rugs is a common problem. Also, small area rugs often slip out of place. You may wish to install rubberized grippers on the bottom of the rug or on the floor underneath it.
- Handrails should be placed at all staircases in and outside the house.
- Cracks in the floors or sidewalks should be patched.
- · Entryways should remain well-lighted.
- Use at least 100-watt bulbs in your home.
- Add ceiling fixtures to rooms lighted by lamps only, or use a lamp that is activated by a switch near the entry point into the room. Another option is to install voice- or sound-activated lamps.
- Avoid wearing house shoes with platform-style soles or with fabric soles. These increase the risk of slipping.
- Only wear house shoes and slippers that have soles with gripping action.

Outdoor Safety Tips

- If sidewalks look slippery, walk on the grass for better traction.
- Many floors in public buildings are made of highly polished marble or tile that can be slippery. When these surfaces are wet, they become slick and dangerous. If floors have plastic or carpet runners, stay on them whenever possible.

Other Concerns

- Vision problems often cause falls. Any suspicion of nearsightedness, farsightedness or cataracts should not go unattended.
- · Know if you are taking medications that may cause dizziness and difficulty standing or walking.
- Muscle weakness, poor agility and poor coordination can also lead to falls. Fortunately, these problems can be reduced with exercise no matter what your age.

Diagnosis

Bone Mineral Density Testing

How Is Osteoporosis Diagnosed?

The diagnosis of osteoporosis is usually made by your doctor using a combination of a complete medical history and physical examination, skeletal X-rays, bone densitometry and specialized laboratory tests. If your doctor finds low bone mass, he or she may want to perform additional tests to rule out the possibility of other diseases that can cause bone loss, including osteomalacia (a Vitamin D deficiency) and hyperparathyroidism (overactivity of the parathyroid glands).

Bone densitometry is a safe, painless X-ray technique that compares your bone density to the peak bone density that someone of your gender and ethnicity should have reached at about age 30-35, when bone density is at its highest.

The technique is often performed in women at the time of menopause. Several types of bone densitometry are used to detect bone loss

in different areas of the body. Your doctor can determine which method would be best suited for you.

What happens during a bone mineral density (BMD) test?

- A BMD test is a special low-dose X-ray and is often referred to as a DEXA test.
 Ultrasound technology is also available for screening purposes.
- There is very little risk involved with any BMD test. (Be sure to tell your health care provider if you are pregnant.)
- You may simply lie, fully clothed, on a table or place your arm inside a machine. Testing usually takes 5-20 minutes.
- Other tips:
 - Dress comfortably; don't wear metal buttons, buckles or zippers.
 - Follow instructions about not taking certain medications or pills before your test.

Bone Mass Measurement

The only sure way to determine bone density and fracture risk for osteoporosis is to have a bone mass measurement, also called bone mineral density (BMD) test. A BMD test measures bone mineral content. The greater the bone mineral content, the stronger or more dense the bone is. If you have low bone density, you may be at risk for fractures. The test also can be used to show the rate of bone mineral loss in those not receiving treatment, and the rate of bone mineral gain in people being treated. There are several ways to measure bone mineral density; all

are painless, noninvasive and safe and are becoming more readily available.

The tests measure bone density in your spine, hip and/or wrist, the most common sites of fractures due to osteoporosis. Recently, bone mineral density tests have been approved by the Food and Drug Administration that measure bone density in the middle finger and the heel or shinbone. Your bone density is compared to two standards, or norms, known as "age-matched" and "young-normal." The "age-matched" reading compares your bone density to what is expected in someone of your age, gender and size. The "young-normal" reading compares your density to the optimal peak bone density of a healthy young adult of the same gender.

A bone mineral density test helps your doctor determine whether you are at risk for a fracture. In general, the lower your bone density, the higher your risk for a fracture. Test results will help you and your doctor decide the best course of action for your bone health.

Who Should Be Tested?

If you have risk factors for osteoporosis, ask your doctor about a bone mineral density test. The National Osteoporosis Foundation recommends BMD testing for:

- 1. All postmenopausal women under age 65 who have one or more risk factors (besides menopause).
- 2. All women aged 65 and older, regardless of other risk factors.
- 3. Postmenopausal women who have a fracture.
- 4. Women who are considering therapy for osteoporosis, if BMD testing would help with the decision.
- Women who have been on hormone replacement therapy for prolonged periods.

Types of BMD Tests

There are several different machines that measure bone density. Central machines measure density in the hip, spine and total body. Peripheral machines measure density in the finger, wrist, kneecap, shinbone and heel. The most common bone mineral density test (also considered to

be the most accurate) is a DEXA (Dual Energy X-ray Absorptiometry) test. This painless test is similar to having an X-ray. A miniature X-ray of the spine or hip is taken along with a measurement of bone mineral content. People who are at risk of osteoporosis, as well as those who have thin bones or evidence of spinal fractures, should be tested for osteoporosis.

- DEXA (Dual Energy X-ray Absorptiometry) measures the spine, hip or total body.
- pDXA (Peripheral Dual Energy X-ray Absorptiometry) measures the wrist, heel or finger.
- SXA (Single Energy X-ray Absorptiometry) measures the wrist or heel.
- QUS (Quantitative Ultrasound) uses sound waves to measure density at the heel, shinbone and kneecap.
- QCT (Quantitative Computed Tomography) is most commonly used to measure the spine but can also be used at other sites.
- pQCT (Peripheral Quantitative Computed Tomography) measures the wrist.
- RA (Radiographic Absorptiometry) uses an X-ray of the hand and a small metal wedge to calculate bone density.
- DPA (Dual Photon Absorptiometry) measures the spine, hip or total body (used infrequently).
- SPA (Single Photon Absorptiometry) measures the wrist (used infrequently).

A BMD test is simple, safe, noninvasive and painless. In most cases, you don't even need to undress. Tests can take anywhere from 30 seconds to five minutes and require no special preparation, medication or injection.

BMD tests are more sensitive than ordinary X-rays and can detect bone loss at an earlier stage. Normal X-rays are not sensitive enough to detect bone loss until at least 30 percent of bone mass has been lost. X-rays are used to rule out other bone or arthritic conditions. Thin bones may be detected on an X-ray, but bone mineral density testing is more accurate.

Treatment of Osteoporosis

Although there is no cure for osteoporosis, there are steps you can take to slow or stop its progress. Adequate calcium, Vitamin D, weight-bearing exercise and, in some cases, medication are important for maintaining bone health. Currently, estrogens, alendronate, risedronate and raloxifene are approved by the Food and Drug Administration for the prevention and treatment of postmenopausal osteoporosis. Calcitonin is approved for treatment only.

Estrogen Replacement Therapy (ERT) and Hormone Replacement Therapy (HRT) (multiple brand names)

ERT is approved for the prevention and management of osteoporosis. ERT has been shown to reduce bone loss, increase bone density in both the spine and hip, and reduce the risk of hip and spinal fractures in postmenopausal women. Progestin may be prescribed in combination with estrogen (HRT) for women who have an intact uterus.

Alendronate Sodium (brand name Fosamax)

Alendronate is approved for the prevention and treatment of osteoporosis. In postmenopausal women with osteoporosis, alendronate reverses bone loss, increases bone density and reduces the risk of fractures at all



body sites. Alendronate is also approved for the treatment of steroid-induced osteoporosis in men and women as a result of long-term use of steroid medications, such as prednisone or cortisone.

Risedronate Sodium (brand name Actonel)

Risedronate is approved for the prevention and treatment of osteoporosis. Risedronate prevents and reverses bone loss, reducing the risk of fractures. Risedronate is also approved for use by men and women to prevent and/or treat steroid-induced osteoporosis that results from long-term use of steroid medications, such as prednisone or cortisone.

Raloxifene (brand name Evista)

Raloxifene is approved for the prevention and treatment of osteoporosis. Raloxifene slows bone loss and helps build bone mass.

Calcitonin (brand name Miacalcin)

Calcitonin is a naturally occurring hormone involved in calcium regulation and bone metabolism. In women who are at least five years beyond menopause, calcitonin slows bone loss and increases bone density at the spine.

Medical Specialists Who Treat Osteoporosis

(in alphabetical order)

Endocrinologists treat the endocrine system, which is made up of the glands and hormones that help control the body's metabolic activity. In addition to osteoporosis, endocrinologists may also treat diabetes and thyroid and pituitary diseases.

Family physicians have a broad range of training that includes surgery, internal medicine, gynecology and pediatrics. They place special emphasis on caring for an individual or family on a long-term, continuing basis.

Geriatricians are family physicians or internists who have received additional training on the aging process and the conditions and diseases that occur more frequently among the elderly, including incontinence, falls and dementia. Geriatricians often care for patients in nursing homes, in patients' homes, or in office or hospital settings.

Gynecologists diagnose and treat conditions of the female reproductive system and associated disorders. They often serve as primary-care physicians for women and follow their patients' reproductive health over time.



Internists diagnose and treat nonsurgical diseases of the body. They provide long-term comprehensive care in the hospital and office, developing expertise in many areas, and often act as consultants to other specialists.

Orthopedic surgeons are physicians trained in the care of patients with musculoskeletal problems. Congenital skeletal deformities, skeletal trauma and infections, and metabolic disturbances are within the scope of orthopedists. They may operate to correct, fix or replace joints and limbs.

Physiatrists are physicians who specialize in physical medicine and rehabilitation. Physiatrists evaluate and treat patients with impairments, disabilities or pain arising from musculoskeletal, neurological or other systemic problems. Physiatrists focus on restoring the physical, psychological, social and vocational functioning of the individual.

Rheumatologists diagnose and treat diseases of the joints, muscles, bones and tendons, including arthritis and collagen diseases. Rheumatologists may work closely with other specialists, such as orthopedists, physiatrists and physical therapists.

Medicare and Osteoporosis

What does Medicare pay for?

Medicare coverage of bone mineral density tests under Part B began on July 1, 1998. Doctors determine a patient's medical history and risk factors in deciding who should have a bone mineral density test and which type of test he or she should have.

Who is eligible for a bone mineral density test under Medicare?

- Women who are being treated for estrogen deficiency and are at clinical risk for osteoporosis, based on their medical history and other findings.
- Men and women with vertebral abnormalities or previous fractures as demonstrated by X-ray.
- Men and women receiving, or planning to receive, long-term glucocorticoid (prednisone or steroid-type) therapy.
- Men and women diagnosed with primary hyperparathyroidism.
- Men and women being monitored to assess the response to or efficacy of an FDA-approved osteoporosis drug therapy.

What will Medicare cover?

Medicare coverage applies as follows:

- Bone mineral density tests apply to all Medicare plans, including managed-care plans.
- · Deductible and co-payments apply.
- Medicare will pay for this test only if it is ordered by a physician or qualified practitioner for a patient he or she is treating.
- Medicare will cover tests every two years, or more frequently if medically necessary.

Resources

Questions to Ask Your Health Care Provider

- Am I at risk for osteoporosis?
- How can I tell if someone in my extended family may have suffered from osteoporosis?
- How do I determine if I have low bone density?
- What type of bone mineral density test is right for me? How often should I be tested?
- Are any of my current medications affecting my bone health?
- What type of exercise should I be doing and how often?
- What type of medication should I consider for present and future bone health? What are the side effects of these drugs?
- What steps can I take to prevent osteoporosis?

SELECTED CALCIUM-RICH FOODS

FOOD ITEM	Serving Size	Calcium (Mg)	Fat (g)	Calories
MILK				
Whole milk	8 oz.	290	8.9	156
1% milk	8 oz.	300	2.6	102
2% milk	8 oz.	297	4.7	121
Skim milk	8 oz.	302	0.4	86
YOGURT				
Plain fat-free (w/added milk solids)	8 oz.	487	0.4	136
Plain low-fat (w/added milk solids)	8 oz.	447	3.7	155
Fruit, low-fat	8 oz.	338	2.8	243
Frozen, vanilla, soft-serve	1/2 cup	103	4.0	114
CHEESE				
American	1 oz.	174	8.9	106
Cheddar	1 oz.	204	9.4	114
Cottage, 1% low-fat	1 cup	138	2.3	164
Mozzarella, part skim	1 oz. 1 oz.	183 203	4.5 8.5	72 104
Muenster Parmesan, grated	1 tbsp.	203 69	6.5 1.5	23
Ricotta, part skim	1/2 cup	337	9.8	171
Ricotta, whole milk	1/2 cup	257	16.1	216
	., = 00p			
ICE CREAM	4/0	04.7	0.0	00
Low-fat	1/2 cup	91.7	2.8	92
High-fat	1/2 cup	86.6	12.0	178
FISH AND SHELLFISH				
Sardines, canned in oil, drained,				
including bones	3.75 oz.	351	10.5	191
Salmon, pink, canned, including bones		181	5.1	118
Shrimp, canned, drained	3 oz.	50	1.7	102
VEGETABLES				
Bok choy, raw (Chinese cabbage)	1 cup	74	0	9
Broccoli, cooked, drained, from raw	1 cup	72	0.6	24
Broccoli, cooked, drained, from frozen		94	0.2	50
Soybeans, mature, boiled	1 cup	261	12.0	254
Collards, cooked, drained, from raw Turnip greens, cooked, drained,	1 cup	226	0.6	49
from raw (leaves and stems)	1 cup	197	0.3	29
` ,	•			
OTHER				
Tofu, raw, firm, prepared with calcium sulfate and magnesium chloride	1/2 cup	*204	5.6	97
Orange (Navel)	1 whole	204 56	0.1	65
Orange juice, calcium-fortified	8 oz.	300	0.1	100
Dried figs	10	270	2.2	477
Almonds, dry roasted	1 oz.	75	15.0	169
Sesame seeds, kernels, toasted	1 oz.	37	13.6	161
Sunflower seeds, dried	1 oz.	33	14.1	162

^{*} The calcium content of tofu may vary depending on processing methods. Tofu processed with calcium salts can have as much as 300 mg. per 4 oz. Often, the label or the manufacturer can provide more specific information.

NOTE: You also may increase the calcium in foods by following these suggestions:
1. Add nonfat powdered milk to all soups, casseroles and drinks.
2. Buy juices, cereals and breads that are fortified with calcium.

- 3. Replace whole milk and cream with skim and low-fat milk in recipes.
- 4. Replace sour cream with yogurt in recipes.
- 5. Some bottled waters contain calcium, so check the labels for more information.

Source: USDA Nutrient Data Laboratory, 2000.

Helpful Organizations and Web Sites

The Web sites below are not necessarily endorsed by the Texas Department of Health. They are listed as helpful resources for consumers.

Texas Department of Health Osteoporosis Awareness and Education Program – This Web site emphasizes the importance of calcium and exercise in the prevention of osteoporosis and includes information on fall prevention and common bone fracture areas. Special features include a report of the state's Osteoporosis Advisory Committee, an osteoporosis fact and tip sheet, and a series of multicultural brochures on ways to maintain bone health.

Telephone 800-242-3399 www.tdh.state.tx.us/osp/osteo

National Osteoporosis Foundation – It provides the most current national updates on osteoporosis research and related events.

Telephone 800-223-9994/202-223-2226 www.nof.org

Ten Warning Signs Your Bones Need Help – This Web site features the top overlooked osteoporosis symptoms, information on diagnosis using bone density tests, and prevention options.

www.prevention.com/report/990517

Strong Women – This Web page is devoted to promoting strength for women, based on the findings of best-selling author Dr. Miriam Nelson.

www.strongwomen.com

Boning Up on Osteoporosis – This article by Carolyn J. Strange examines ways to lessen the effects of osteoporosis and reduce its severity. The site provides contact information for additional resources for aging populations.

www.fda.gov/fdac/features/796 bone.html

Creighton University Osteoporosis Research Center – This University-based research center advocates bone research. Its Web site contains helpful information on osteoporosis as well as contact information for osteoporosis-related organizations.

osteoporosis.creighton.edu

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Foundation for Osteoporosis Research and Education – This organization is dedicated to serving both the public and the medical community through research and education.

Helpful Organizations

Telephone 888-266-3015 www.fore.org

Malka Orthopaedics – This Web site provides a basic explanation of how bones change over time and information on osteoporosis. Links to information about the treatment of osteoporosis and the calcium content of foods are available.

www.orthohelp.com/osteop.htm

Healthfinder – Do a search using "osteoporosis" as the key word. This will supply a list of links that provide information on how osteoporosis affects men and women of various races and ethnicities.

www.healthfinder.gov

National Institutes of Health, Osteoporosis and Related Bone Diseases~ National Resource Center – Its Web site contains information for health care professionals, patients and the public about osteoporosis and other bone-related diseases, such as Paget's disease and osteogenesis imperfecta.

Telephone 800-624-BONE/800-624-2663 www.osteo.org

National Osteoporosis Society – Its Web site answers such questions as "What is osteoporosis?" and "Who is at risk?" Prevention and treatment information is available for patients and health professionals.

www.nos.org.uk

International Osteoporosis Foundation – Its Web site features osteoporosis news from around the world.

www.osteofound.org

Osteo-Preventives – This Web site has information about preventing osteoporosis. A list of risk factors is available.

www.frontier.net/~osteoprevent/home.html

Osteoporosis – Endorsed by the Society of Obstetricians and Gynaecologists of Canada, this site presents information about osteoporosis prevention and treatment. The text is available in English and French.

www.sogc.org/door/osteoporosis.html

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Helpful Organizations

American Council on Science and Health – Its Web site provides information that includes statistics on osteoporosis, the role of dietary calcium, risk factors and prevention.

Telephone 212-362-7044 www.acsh.org/publications/booklets/osteo.html

Imaginis.com – This women's health Web site features information on bone health, risk factors for osteoporosis, symptoms, diagnosis and treatment.

www.imaginis.com/osteoporosis

HeliosHealth.com – You will find news and discussions regarding osteoporosis. Topics include diagnosis, risk factors, prevention and treatment.

www.helioshealth.com/osteoporosis

Osteoporosis and Paget's Disease Drug Database – This Web site is a database of commonly prescribed drugs for osteoporosis and Paget's disease.

www.coreynahman.com/osteoporosis_pagets.html

Osteoporosis Online – The Osteoporosis Society of Canada's Web site provides up-to-date information on the risks, prevention, diagnosis and treatment of osteoporosis.

www.osteoporosis.ca

USDA Bone Builders: Support Your Bones With Healthy Habits – This is a Web page devoted to understanding and preventing osteoporosis. Included is an article discussing how young girls typically do not get enough calcium.

Telephone 888-INFO-FDA/888-463-6332 www.fda.gov/fdac/features/1997/697_bone.html

Clueless in the Mall – It is an interactive, educational Web site for teens to learn about the importance of calcium and disease prevention.

calcium.tamu.edu

For Men

Osteoporosis in Men – This Web site supplies information on risk factors, testing and treatments for men suffering from osteoporosis.

www.geocities.com/HotSprings/8741

Health Plan General Requirements and Information

Insurance plans are based on a wide array of variables. The following information is from some of the largest group plans in Texas. It is included as an example; details may vary based on where a person lives or the specifics of his or her plan.

Health Plan	Available in all Areas of Texas?	Will Provide Coverage for a BMD Test?	Requirements for Coverage	Required Payment by the Patient	Telephone
BLUE CROSS BLUE SHIELD HMO Blue	Yes	Yes	• Physician's referral	Co-pay; amount of co-pay depends on the specifics of the policy	1-888-585-6799
BLUE CROSS BLUE SHIELD Health Select Plus HMO		Yes	• Physician's referral	Co-pay; amount of co-pay depends on the specifics of the policy	1-888-585-9393
AETNA <i>Managed</i> <i>Choice POS</i>		Yes	 35 years of age or older Covered under wellness policy for women 	Co-pay; amount of co-pay depends on the specifics of the policy	1-888-778-6157
AETNA <i>Managed</i> <i>Choice PPO</i>		Yes	 35 years of age or older Covered under wellness policy for women 	Co-pay; amount of co-pay depends on the specifics of the policy	1-888-778-6157

(BMD = bone mineral density test)

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Health Plan General Requirements and Information, continued

Health Plan	Available in all Areas of Texas?	Will Provide Coverage for a BMD Test?	Requirements for Coverage	Required Payment by the Patient	Telephone
AETNA <i>HMO</i>		Yes	Physician's referral35 years of age or olderCovered under wellness policy for women	Co-pay; amount of co-pay depends on the specifics of the policy	1-888-778-6157
HUMANA <i>HMO</i>		Yes	Physician's referral required until the woman is 45 years old and covered by well-woman care	Co-pay; amount of co-pay depends on the specifics of the policy	1-888-523-0023
HUMANA PPO		Yes	Woman may choose to spend he The allowance is either \$200 or \$50	Woman may choose to spend her health plan allowance to pay for this test. The allowance is either \$200 or \$500, depending on what the employer chooses.	1-888-523-0023
MUTUAL OF OMAHA INSURANCE <i>The Edge PPO</i>	Yes	Yes	• Physician's request	Co-pay; amount of co-pay depends on the specifics of the policy	1-800-775-6000
UNICARE PPO	Yes	Yes	• Covered under preventive care	Co-pay; amount of co-pay depends on the specifics of the policy	1-800-718-9355

(BMD = bone mineral density test)

Health Plan General Requirements and Information, continued

Health Plan	Available in all Areas of Texas?	Will Provide Coverage for a BMD Test?	Requirements for Coverage	Required Payment by the Patient	Telephone
AMERICAN NATIONAL INSURANCE CO. <i>True Group PPO</i>		Yes	Deductible and coinsurance must be met before coverage is provided	After deductible and coinsurance are met, this test is covered 100%	1-800-899-6503
UNITED HEALTH CARE OF TEXAS PPO Product		Yes	Deductible and coinsurance must be met before coverage is provided	After deductible and coinsurance are met, this test is covered 100%	1-800-411-1145
UNITED HEALTH CARE OF TEXAS HMO		Yes	• Physician's referral	Coinsurance; this is a percentage of the actual cost of the test	1-800-411-1145
UNITED HEALTH CARE OF TEXAS <i>Open Access HMO</i>		Yes	No stipulations	Coinsurance; this is a percentage of the actual cost of the test	1-800-411-1145

(BMD = bone mineral density test)

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Health Plan General Requirements and Information, continued

Telephone	1-800-736-2373	1-800-729-3541	1-800-238-8801
Required Payment by the Patient	Payment by the patient depends on the individual's specific policy requirements	Payment may be a co-pay or may be the deductible and coinsurance, depending on the provider's billing practice	Co-pay; amount of co-pay depends on the specifics of the policy
Requirements for Coverage	• If no preventive plan is in place, this test will only be covered with a physician's referral. The physician must suspect that the woman has osteoporosis.	Typically is covered, but the amount of payment that the patient is responsible for is dependent upon the provider's billing practices	 This test is covered only if it is written as part of the benefits package at the employer's request Most likely to be covered with a physician's referral
Will Provide Coverage for a BMD Test?	May or may not cover	May or may not cover	May or may not cover
Available in all Areas of Texas?	Yes	Yes	Yes
Health Plan	PACIFIC LIFE INSURANCE PPO	PRINCIPAL FINANCIAL GROUP PPO	CIGNA PPO

(BMD = bone mineral density test)

Glossary of Terms

- **bone densitometry** a medical technique to measure bone density or strength
- **bone density** the amount of mineral in any given volume of bone
- **bone mass** the amount of mineral in a bone. Although this is different from bone density, the terms are often used interchangeably.
- bone mineral density (BMD) test a test that looks at how dense bones are at the spine, hip, wrist or heel. BMD tests provide information on bone health sooner and can find problems earlier than an ordinary X-ray. The lower the bone mineral density, the higher the risk of fracture.
- **calcium** the most important mineral found in bone
- estrogen female hormone produced by the ovaries
- estrogen replacement therapy (ERT) a treatment used to replace the estrogen lost after a woman stops menstruating and no longer produces her own estrogen
- **formation** one stage of the bone remodeling process. New bone tissue is laid down to replace the old tissue that was removed during resorption.
- fracture a break in a bone
- **hormone** a chemical produced in one organ of the body that controls or affects the functions of other organs in the body
- hormone replacement therapy (HRT) a treatment used to replace the estrogen lost after a woman stops menstruating and no longer produces her own estrogen; uses both estrogen and progestin
- hypothyroidism a condition in which not enough thyroid hormone
 is produced
- low bone density a condition in which bones are not as thick or strong as they should be, compared to other people of the same gender and age

- **menopause** the time in a woman's life when her menstrual periods end and she no longer produces estrogen
- osteoporosis a condition in which bones become weak and brittle and are likely to break
- **peak bone mass** the maximum density or thickness of your bones. This is usually reached in your 30s.
- **postmenopausal** the time in a woman's life after she has gone through menopause and no longer has menstrual periods
- **remodeling** the process of change that occurs in bones throughout life. It is marked by two stages, resorption and formation.
- **resorption** one stage of the bone remodeling process in which old bone tissue is broken down and removed
- **steroid therapy** a type of medical treatment using chemicals
- vertebral relating to the bones in your spine
- weight-bearing exercise type of exercise that makes the bones support the weight of the body against gravity

By ZIP Code

These sites are registered by the Texas Department of Health's Bureau of Radiation Control for the use of bone densitometers (X-ray machines). The equipment has been approved and authorized for use in bone mineral density testing.

75000

Joseph, John M., MD 2008 East Hebron Parkway, Suite A Carrollton, TX 75007 972-492-8700

Tenet Healthsystems Hospital Dallas Inc. 4343 North Josey Lane Carrollton, TX 75010 972-492-1010

Medicine Shoppes Incorporated 400 North Allen Drive, Suite 102 Allen, TX 75013 972-390-9888

Texoma Care 1014 Memorial Drive Denison, TX 75020 903-416-6012

Garvin, Clifford David, MD PA ABFP 100 Memorial Drive Denison, TX 75020 903-463-8448

David F. Varnell Ventures One Inc. 3525 Louis Drive Plano, TX 75023 972-618-3107

Shields, Robert F., DO 2237 West Parker Road, Suite D Plano, TX 75023 972-596-5303

Novartis Pharmaceuticals Corporation 2212 Blue Sage Drive Flower Mound, TX 75028 800-631-8184 Republic Health Corporation of Rockwall P.O. Box 1550 Rowlett, TX 75030-1550 972-412-2273

Las Colinas Ob Gyn 6750 North MacArthur Boulevard, Suite 302 Irving, TX 75039 972-869-4488

Baylor Medical Center at Garland 2300 Marie Curie Drive Garland, TX 75042 972-487-5170

Family Medical Center at Garland 530 Clara Barton Garland, TX 75042 972-272-6561

Sakovich, Peter, MD PA 1037 West Shady Grove Irving, TX 75060 972-251-1178

Baylor Medical Center at Irving 1901 North MacArthur Boulevard Irving, TX 75061 972-579-8100

Irving Healthcare System 1901 North MacArthur Boulevard Irving, TX 75061 972-579-8700

Medical and Surgical Clinic of Irving PA 2023 West Park Drive Irving, TX 75061 972-253-4315 Healthsouth Diagnostic Center of TX LLP 3700 West 15th Street, Bldg. D, Suite 100 Plano, TX 75075 972-867-7743

Freer, Timothy W., MD PA 3800 West 15th Street, Suite 111 Plano, TX 75075 972-985-9649

Richardson Hospital Authority 401 West Campbell Road Richardson, TX 75080 972-498-7600

Richardson Orthopedic 1910 North Collins Boulevard Richardson, TX 75080 972-238-1041

Henry, Katherine S., MD PA 721 West Arapaho, Suite 2 Richardson, TX 75080 972-234-4776

Bell, Richard C., MD PA 403 West Campbell Road, Suite 102 Richardson, TX 75080 972-498-7681

Wilson N. Jones Memorial Hospital 500 North Highland Sherman, TX 75090 903-870-4180

Columbia Medical Center of Sherman 1111 Gallagher Road Sherman, TX 75090 903-870-7255

Texoma Center for Family Medicine PA 809 Gallagher Drive, Suite C Sherman, TX 75090 903-892-8398

The North Texas Center for Women's Health 425 North Highland, Suite 100 Sherman, TX 75092 903-893-2627

Presbyterian Healthcare Center of North Texas 6200 West Parker Road Plano, TX 75093 972-608-8051 Texas Health Research Institute 6300 West Parker Road, Suite 100 Plano, TX 75093 972-608-5162

Willowbend Women's Center PA 6300 West Parker Road, Suite 325 Plano, TX 75093 972-608-0808

75100

Phycor of Corsicana Box 841 Corsicana, TX 75110 903-872-4611

Ellis County Medical Associates 802 West Lampasas Ennis, TX 75119 972-845-4700

Presbyterian Hospital of Kaufman P.O. Box 310 Kaufman, TX 75142 972-932-7200

Hughes, Mark D., and Associates P.O. Box 43406 Seven Points, TX 75143 903-432-2707

Columbia Medical Center at Lancaster 2600 West Pleasant Run Road Lancaster, TX 75146-0720 972-223-9600

Southwest Rheumatology PA 1010 North Beltline Road, Suite 105 Mesquite, TX 75149 972-329-6565

Physician Reliance Network Inc. 1660 Republic Parkway Mesquite, TX 75150 972-613-5696

Grant J. Kirkland, MD FACOG 3500 I-30, Suite B 120 Mesquite, TX 75150 972-686-8200

By ZIP Code

By ZIP Code

Glenn Garrett Clinic Association 402 North Kaufman Linden, TX 75563 903-756-5581

Flores, Dennis R., MD 500 Hospital Drive New Boston, TX 75579 903-628-2734

75600.....

Good Shepherd Medical Center 700 East Marshall Street Longview, TX 75601 903-236-2072

Internal Medicine Association Longview 703 East Marshall Street, Suite 1001 Longview, TX 75601 903-753-7291

East Texas Primary Care Associates PLLC 2101 West Loop 281 Longview, TX 75604 903-759-7200

Diagnostic Clinic of Longview PA 707 Holleybrook Drive Longview, TX 75605 903-232-8561

East Texas Medical Center-Carthage P.O. Box 549 Carthage, TX 75633 903-693-0285

Henderson Memorial Hospital 300 Wilson Street Henderson, TX 75652 903-065-7541

Roy H. Laird Memorial Hospital 1612 South Henderson Boulevard Kilgore, TX 75662 903-984-3505

John, C. L., MD PA 618 South Grove, Suite 300 Marshall, TX 75670 915-643-9830 Trinity Mother Frances Health Systems 800 East Dawson Tyler, TX 75701 903-593-8441

75700

East Texas Medical Center Cancer Institute 700 Olympia Plaza, Suite 100 Tyler, TX 75701 903-535-6304

Taylor, Patrick, MD PA 1034 Clinic Drive Tyler, TX 75701 903-533-8161

Trinity Internal Medicine 1034 Clinic Drive Tyler, TX 75701 903-533-8161

University of Texas Health Center Tyler 11937 Hwy 271 at Hwy 155 Owentown, TX 75708 903-877-3451

East Texas Medical Imaging 810 Lucas Drive Athens, TX 75751 903-675-6671

Lakeland Medical Associates 1123 South Palestine Athens, TX 75751 903-675-2245

Athens Women's Center 1336 South Palestine Athens, TX 75751 903-675-7376

Chandler Family Medical Center P.O. Box 368 Chandler, TX 75758 903-849-6047

ETMC Jacksonville 501 South Ragsdale Street Jacksonville, TX 75766 903-586-3000

Wasson, James L., MD 203 Nacogdoches, Suite 280 Jacksonville, TX 75766 903-586-2207

Low, James Ray Jr., MD PA 203 Nacogdoches, Suite 360 Jacksonville, TX 75766 903-586-3505

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By ZIP Code

East Texas Diagnostic Clinic PA 4002 South Loop 256, Suite A Palestine, TX 75801 903-723-8800

Internal Medicine Associates of Palestine 2217 South Sycamore, Suite 101 Palestine, TX 75801 903-729-3993

East Texas Family Medicine 4201 South Loop 256 Palestine, TX 75801 903-723-8533

Gorby, Michael, MD PA 126 Medical Drive, Suite B Palestine, TX 75801 903-729-8328

Bennett, Charles Jr., MD 126 Medical Drive, Suite A Palestine, TX 75801 903-729-4566

Aguirre Family Care Clinic PA P.O. Box 398 Buffalo, TX 75831 903-322-2204

75900

Randall Medical Clinic 1019 East Denman Avenue, Suite B Lufkin, TX 75901 936-637-2080

Sloan, Lance, MD PA 1115 Ellis Lufkin, TX 75901 936-632-4282

Center for Arthritis & Respiratory Diseases 710 Gaslight, Suite A Lufkin, TX 75904 936-634-0527 East Texas Chest Clinic PA 818 West Frank Street Lufkin, TX 75904 936-639-6210

Angelina Internal Medicine Associates 1222 Ellis Avenue Lufkin, TX 75904-3326 936-639-2244

Singson, Florencio, MD P.O. Box 1985 Center, TX 75935 936-598-2933

Pineywoods Diagnostic Clinic P.O. Box 1297 Huntington, TX 75949 936-876-5719

Global Health Enterprises Inc. 1001 Dickerson Drive Jasper, TX 75951 409-384-2575

Complete Healthcare Services PA 315 West Houston Jasper, TX 75951 409-384-3430

Nacogdoches Medical Center 4920 Northeast Stallings Drive Nacogdoches, TX 75961 936-569-0895

Nacogdoches Medical Clinic 1018 Mound Street, Suite 206 Nacogdoches, TX 75961 936-560-2920

Labarbera, Philip T., MD 4944 Northeast Stallings Drive Nacogdoches, TX 75961-1595 936-564-3751

San Augustine Memorial Hospital P.O. Box 658 San Augustine, TX 75972 936-275-3446

76000.....

Radiology Associates of Tarrant County 801 Road to Six Flags West Arlington, TX 76012 817-321-0426

Swanson, Jan, DO FACP 900 West Randall Mill, Suite 111 Arlington, TX 76012 817-268-4100

Healthsouth Diagnostic Center of Texas 601 West Arbrook Boulevard Arlington, TX 76014 817-472-0801

Matlock Ob/Gyn Associates 515 West Mayfield, #305 Arlington, TX 76014 817-468-4689

Omega Ob-Gyn of South Arlington 505 Omega Drive Arlington, TX 76014 817-468-3255

Bedford Imaging 2921 Brown Trail, Suite 110 Bedford, TX 76021 817-581-9996

Mid-Cities Arthritis Clinic PA 1305 Airport Freeway, Suite 420 Bedford, TX 76021 817-358-0100

Kaner Medical Group PA 1305 Airport Frwy, Suite 220 Bedford, TX 76021 817-685-9633

Northeast Tarrant Internal Medicine Assoc. 469 West Parkway Euless, TX 76022 817-358-5500

Aboukhair, Nabil, MD 11797 South Freeway, Suite 242 Burleson, TX 76028 817-551-0454

Walls Regional Hospital 201 Walls Drive Cleburne, TX 76031 817-556-4395 Altenberg, Leo L., MD PA 412 North Main Street, Suite 100 Euless, TX 76039 817-858-0111

Osteoporosis Center of North Texas 350 Westpark Way, Suite 120 Euless, TX 76040 817-481-5544

Glen Rose Medical Center P.O. Box 2099 Glen Rose, TX 76043 254-897-2215

Granbury Internal Medicine Associates PC 1318 Paluxy Road Granbury, TX 76048 817-573-8805

Grapevine Internal Medicine Centre 1604 Lancaster Grapevine, TX 76051 817-481-8661

Texas Healthworks Incorporated 600 West Northwest Highway, Suite E Grapevine, TX 76051 817-329-7703

Grapevine Imaging and Pain Management 2401 Ira East Woods, Suite 600 Grapevine, TX 76051 817-488-9991

Healthsouth Diagnostic Center of Texas 1717 Precinct Line Road, Suite 103 Hurst, TX 76054 817-498-6575

Campbell Health System 713 East Anderson Weatherford, TX 76086 817-596-8751

76100

The Fort Worth Clinic 909 Ninth Avenue, Suite 300 Fort Worth, TX 76104 817-336-7191

All Saints Episcopal Hospital 1400 Eighth Avenue Fort Worth, TX 76104 817-927-6151

> Medical Clinic of North Texas PA 1651 Rosedale, Suite 200 Fort Worth, TX 76104 817-334-1435

By ZIP Code 817-334-1435

Consultants in Radiology PA 1101 Sixth Avenue Fort Worth, TX 76104 817-336-4636

Radiology Associates of Tarrant County 816 West Cannon Street Fort Worth, TX 76104 817-321-0426

Fort Worth Diagnostic Clinic 1650 West Rosedale, Suite 100 Fort Worth, TX 76104 817-338-1131

Wilson, Stephen L., MD 1015 South Henderson Fort Worth, TX 76104 817-870-1035

Rose, Herman, MD FACP 1315 Sixth Avenue Fort Worth, TX 76104 817-921-3626

Castro, Jaime H., MD 1650 West Rosedale, Suite 103 Fort Worth, TX 76104 817-334-0137

North Texas Affiliated Medical Group 1325 Pennsylvania Avenue, Suite 450 Fort Worth, TX 76104 817-878-5262

Herd, Herd and Minton 1325 Pennsylvania, Suite 370 Fort Worth, TX 76104 817-878-5370

Whitfield, John A., MD 1307 Eighth Avenue, Suite 404 Fort Worth, TX 76104 817-927-2229 Breast Care Center of Texas PA 1400 Eighth Avenue, Suite 100 Fort Worth, TX 76104 817-924-9349

Osteopathic Medical Center of Texas 1000 Montgomery Street Fort Worth, TX 76107 817-735-3543

Female Health Associates 2600 Montgomery Street Fort Worth, TX 76107 817-731-3936

University Surgery Center Inc. 311 University Drive, Suite 100 Fort Worth, TX 76107-1924 817-877-1002

University of North Texas Health Science 3500 Camp Bowie Boulevard Fort Worth, TX 76107-2690 817-735-2697

Troutman, Edwin G., MD 11803 South Freeway, Suite 315 Fort Worth, TX 76115 817-293-1000

Cabansag, Remedios R., MD PA 11803 South Freeway, Suite 254 Fort Worth, TX 76115 817-551-2963

Harris Methodist Southwest Hospital 6100 Harris Parkway Fort Worth, TX 76132 817-346-5090

Tarrant Family Practice 4504 Boat Club Road, Suite 800 Fort Worth, TX 76135 817-237-0515

Unell, Alan M., MD PA 4351 Booth Calloway, Suite 301 North Richland Hills, TX 76180 817-595-2522

76200.....

North Texas Medical Surgical PA 2509 Scripture, Suite 200 Denton, TX 76201 940-898-7400

Texas Woman's University P.O. Box 425799 Denton, TX 76204-5799 817-898-2391

Denton Regional Medical Center 3535 IH-35 East Denton, TX 76205 940-566-4160

Denton Prescription Shop Incorporated 2500 Lillian B. Miller Parkway Denton, TX 76205-2902 940-382-1618

United Clinics of North Texas PLLC 1010 North Mill Street Bowie, TX 76230 940-872-1121

Three Rivers MSO Inc. 1001 West Eagle Drive Decatur, TX 76234 817-627-7443

Aware, Khawaja N., MD PA 801 North Grand Avenue, Suite 1 Gainesville, TX 76240 940-668-7231

76300

United Regional Health Care System Inc. 1600 11th Street Wichita Falls, TX 76301 940-761-8220

Texoma Women's Clinic 1601 Ninth Street Wichita Falls, TX 76301 817-723-8151

North Texas Rheumatology 1104 Brook Avenue Wichita Falls, TX 76301 940-763-3797 Phycor Wichita Falls Inc. 501 Midwestern Parkway East Wichita Falls, TX 76302 817-766-3551

Myers, Jerry K., MD 5500 Kell West Boulevard, Suite 100 Wichita Falls, TX 76310 940-696-5335

Harvest Drug & Gift Incorporated 306 South Avenue D Burkburnett, TX 76354 940-569-5282

Park Clinic PA 310 West Alameda Iowa Park, TX 76367 940-592-4141

76400

Stephenville Medical and Surgical Clinic 150 River North Boulevard Stephenville, TX 76401 254-968-6051

Stephens Memorial Hospital 200 South Geneva Street Breckenridge, TX 76424 254-559-2241

Breckenridge Family Clinic PA 103 South Hartford Breckenridge, TX 76424 254-559-3363

76500

Promedco of Temple Inc. 1905 Southwest H. K. Dodgen Loop Temple, TX 76502 254-778-2123

Scott and White Memorial Hospital 2401 South 31st Street Temple, TX 76508 254-724-2111

Hamilton General Hospital 400 North Brown Avenue Hamilton, TX 76531 254-386-3151

76600

NHCI of Hillsboro Inc. 1321 East Franklin Hillsboro, TX 76645 254-582-8425

By ZIP Code

Parkview Regional Hospital 312 East Glendale Mexia, TX 76667 254-562-5332

76700

Fung Hing-Scheung, Eugene, MD PA 2911 Herring Avenue, Suite 203 Waco, TX 76708 254-755-4582

Waco Ob-Gyn 2124 North 25th Waco, TX 76708 254-752-4395

Haskett, W. Richard, MD PA 3115 Pine Avenue, Suite 306 Waco, TX 76708 254-752-9955

Wilcox, Patricia A., MD PA 2201 McArthur Drive, Suite 2200 Waco, TX 76708 254-752-2300

Hillcrest Ob-Gyn Associates 3115 Pine Avenue, Suite 708 Waco, TX 76708 254-753-3190

Waco Radiological Clinic PA 405 Londonderry, Suite 104 Waco, TX 76712 254-751-4900

Providence Health Alliance 301 Richland West Circle Waco, TX 76712 254-776-8333

Healthy Images Inc. 7736 Central Park Drive, Suite 1 Waco, TX 76712 888-750-1714

76800

Central Texas Women's Clinic PA 2410 Crockett Brownwood, TX 76801 915-643-1526

Crawford, Debbie, DO & Associates 107C Southpark Drive Brownwood, TX 76801 915-646-1195

Brownwood Specialty Center 2502 Crockett Brownwood, TX 76801 915-646-5521

Brownwood Regional Hospital P.O. Box 760 Brownwood, TX 76804 915-646-8541

76900

Anderson Chiropractic Center 3808 Sherwood Way San Angelo, TX 76901 915-949-1600

Shannon Clinic 120 East Beauregard San Angelo, TX 76903 915-658-1511

Christensen, Edward W., MD PA 102 North Magdalen, Suite 240 San Angelo, TX 76903 915-658-7523

West Texas Medical Associates 3555 Knickerbocker Road San Angelo, TX 76904 915-949-9555

77000

Sisters of Charity of the Incarnate Word 1919 LaBranch Houston, TX 77002 713-756-8890 Christus Health System 1919 LaBranch Houston, TX 77002 713-757-1000

Bueso, Gerardo, MD PA 1213 Hermann Drive, Suite 330 Houston, TX 77004 713-520-8385

Rheumatic Disease Clinic of Houston 1213 Hermann Drive, Suite 550 Houston, TX 77004 713-521-7865

Texas Nuclear Imaging 1213 Hermann Drive, Suite 885 Houston, TX 77004 713-523-6700

Del Castillo, Hector Jr., MD PA 1213 Hermann Drive, Suite 220 Houston, TX 77004 713-526-4787

Medical Clinic of Houston LLP 1707 Sunset Boulevard Houston, TX 77005 713-526-5511

No. 2 Chelsea X-ray No. 2 Chelsea Place Houston, TX 77006 713-523-3153

Memorial Hospital Northwest 1635 North Loop West Houston, TX 77008 713-867-3341

Perone, Nicola, MD 1631 North Loop West, Suite 560 Houston, TX 77008 713-868-1168

Columbia East Houston Medical Center 13111 East Freeway Houston, TX 77015 713-393-2331

Parkview Medical Associates PA 910 South Wayside, Suite 100 Houston, TX 77023 713-921-7176 Memorial City Medical Center Radiology Department 902 Frostwood Houston, TX 77024 713-867-4668

McKeever Orthopedic Clinic 902 Frostwood, Suite 309 Houston, TX 77024 713-461-5575

Memorial Clinical Associates 8800 Katy Freeway, Suite 210 Houston, TX 77024 713-461-2220

Safro, Ivor L., MD 920 Frostwood, Suite 530 Houston, TX 77024 713-465-9390

Solis, Pat, MD 909 Frostwood, Suite 162 Houston, TX 77024 713-827-1500

Village Family Practice PLLC 8584 Katy Freeway, Suite 320 Houston, TX 77024 713-461-2915

West Houston Family Practice 9055 Katy Freeway, Suite 310 Houston, TX 77024 713-467-7572

Greater Anesthesiology Services PA 8707 Katy Freeway, Suite C Houston, TX 77024 713-461-0897

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